

ABSTRACT OF THE INVENTION

The present invention pertains to the discovery that *B. anthracis* possesses a *luxS* gene that encodes a functional LuxS polypeptide, and that *B. anthracis* synthesizes a functional AI-2 quorum-sensing molecule. The invention provides mutant *B. anthracis* bacteria lacking the function of the *luxS* gene, which do not produce a functional AI-2 molecule and have growth defects compared to wild-type *B. anthracis*. The invention also concerns methods for inhibiting the growth of *B. anthracis*, or for preventing or treating *B. anthracis* infection, by inhibiting the activity of the *B. anthracis* LuxS polypeptide, or by exposure of the *B. anthracis* to furanone. In particular, the invention concerns the use of furanone, a compound that inhibits AI-2-mediated quorum-sensing, to inhibit the growth of *B. anthracis*, to inhibit *B. anthracis* toxin production, particularly that of protective antigen, and to prevent or treat *B. anthracis* infection. The invention also provides methods to prevent *B. anthracis* infection, or enhance an immune response to *B. anthracis* infection, by administering a vaccine comprising a *B. anthracis* cell in which the *luxS* gene is mutated.